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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,781	12/07/2000	Jonathan Herman Fischer	FISCHER 35-47-14	9128

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EXAMINER

BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/730,781

Applicant(s)

FISCHER ET AL.

Examiner

Walter F Briney III

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-5, 10, 12-14, 20-23, 25, 32, and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Yeap et al. (US Patent 6,052,420).

Claim 1 is limited to a **DSL front end, comprising: a hybrid that provides a bi-directional interface with a communication channel**; Yeap discloses a hybrid (figure 5, element 13 and column 5, lines 53-56). **An AM interference canceller that outputs a signal representative of AM interference to said hybrid**; Yeap discloses a noise estimator (i.e. AM interference canceller) that outputs a cancellation signal (i.e. signal representative of AM interference) that is operative to cancel out the interference presented to the hybrid (figure 5 and column 6, lines 16-24). **Said hybrid generating an output signal representative of a signal received from said communication channel**; Yeap discloses the hybrid generating an output representing its input (i.e. communication channel) (column 5, line 53-column 6, line 6). **A summer that combines said output of said AM interference canceller with a signal based upon said output of said hybrid such that said AM interference in said DSL front end is**

substantially cancelled; Yeap discloses subtracting with an adder the differential signal (i.e. output of hybrid) and common mode noise (i.e. output of AM interference canceller) (column 5, lines 53-column 6, line 6). Therefore, Yeap discloses all limitations of the claim.

Claim 3 is limited to **the DSL front end according to claim 1**, as covered by Yeap, **wherein: said digital subscriber line is an asymmetric DSL (ADSL)**; Yeap discloses providing interference cancellation for a ADSL (column 2, lines 31-62). Therefore, Yeap discloses all limitations of the claim.

Claim 4 is limited to **the DSL front end according to claim 1**, as covered by Yeap, **further comprising: an adaptive circuit to determine an amount of differential mode coupling of said interfering AM radio signal with respect to an amount of common mode coupling of said interfering AM radio signal**; Yeap discloses performing cross correlation (i.e. determining an amount of similarity of one signal with respect to another) between a common mode signal (i.e. interfering AM radio signal) (figure 2, element 17) and the noise corrected differential signal (i.e. signal representative of differential mode coupling) (figure 2, element 20) to determine how much differential interference exists on the received signal (figure 2, element S_{DM} and column 3, lines 37-43). Therefore, Yeap discloses all limitations of the claim.

Claim 5 is limited to **the digital subscriber line front end according to claim 1**, as covered by Yeap, **further comprising: a reference AM radio wave receiver to output said signal representative of AM interference**; Yeap discloses an adder (i.e. AM radio wave receiver) that outputs the common mode interference (i.e. signal

representative of AM interference) (column 5, line 53-column 6, line 6). Therefore, Yeap discloses all limitations of the claim.

Claim 10 is essentially the same as claim 1, as covered by Yeap, with the further limitation of **a digital subscriber line front end, comprising: a DSL receiver**; Yeap discloses a DSL receiver (figure 1, element 14 and column 5, lines 43-52). **A hybrid summer to combine a signal destined for input to said DSL receiver with an output of said AM interference canceller module.** Yeap discloses a summing junction (i.e. **a hybrid summer**) (figure 5, element 19) that combines receiving data with interference canceling data, the output is sent to the DSL receiver. Therefore, Yeap discloses all limitations of the claim.

Claims 12-14 are essentially the same as claim 3-5, respectively, and are rejected for the same reasons.

Claim 20 is essentially the same as claim 10, as covered by Yeap, and is rejected for the same reasons.

Claims 21 and 22 are rejected for the same reasons as claim 4.

Claim 23 is essentially the same as claim 4 and is rejected for the same reasons.

Claim 25 is essentially the same as claim 3 and is rejected for the same reasons.

Claims 32 and 33 are essentially the same as claims 10 and 21, respectively, and are rejected for the same reasons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 11, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeap in view of Bingel et al. (US Patent 6,173,021).

Claim 2 is limited to **the DSL front end according to claim 1**, as covered by Yeap. Therefore, Yeap has been shown to disclose all limitations of the claim with the exception of **wherein: said summer is a digital summer**; Yeap discloses an all digital implementation of his invention, but discloses an analog adder (Yeap, column 9, line 60-column 10, line 20). Bingel teaches performing all elements of RFI cancellation digitally including using a digital adder (Bingel, figure 2, element 12) to perform the subtraction between a received signal and the output of a DSP (i.e. the DSP of Yeap), which reduces the amount of analog hardware that is bigger and less integrable than digital hardware. It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the digital datapath as taught by Bingel for the purpose of reducing the amount of analog hardware which is bigger and less integrable than digital hardware.

Claim 11 is essentially the same as claim 2 and is rejected for the same reasons.

Claim 24 is essentially the same as claim 2 and is rejected for the same reasons.

Claims 7-9, 16-18, 26-29, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeap in view of Shenoi (US Patent 5,764,704).

Claim 7 is limited to **the DSL front end according to claim 1**, as covered by Yeap. Yeap discloses a bandpass filter used in processing the common mode interference signal. Therefore, Yeap discloses all limitations of the claim with the exception **wherein said AM interference canceller comprises: a Hilbert bandpass filter**; Shenoi teaches using a Hilbert bandpass filter for performing narrowband filtering of periodic carrier type signals (i.e. AM radio waves) (column 2, lines 18-28). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the Hilbert bandpass filter of Shenoi for the purpose of providing the narrowband bandpass filters of Yeap used for generating an interference cancellation signal.

Claim 8 is limited to **the DSL front end according to claim 7**, as covered by Yeap in view of Shenoi, **wherein said AM interference canceller further comprises: an FFT analyzer to determine a frequency of a most significant AM radio signal**; Yeap discloses using an FFT analyzer to determine the frequency of a most significant common mode interference (i.e. AM radio signal) (column 6, lines 31-36 and column 10, lines 5-8). Therefore, Yeap in view of Shenoi makes obvious all limitations of the claim.

Claim 9 is limited to **the DSL front end according to claim 7**, as covered by Yeap in view of Shenoi. Yeap discloses an adaptive algorithm used to update the filter coefficients of the bandpass filters. Therefore, Yeap in view of Shenoi makes obvious all limitations of the claim with the exception **wherein said AM interference canceller further comprises: an LMS module to adjust a frequency of I and Q channels of said Hilbert bandpass filter**; The examiner takes Official Notice of the fact that the

LMS algorithm is used to perform adaptive updating of a noise cancellation system. It would have been obvious to one of ordinary skill in the art at the time of invention to implement an LMS module for the purpose of updating the Hilbert bandpass filters of Yeap in view of Shenoi.

Claims 16-18 are essentially the same as claim 7-9, respectively, and are rejected for the same reasons.

Claims 26 and 27 are essentially the same as claims 7 and 9, respectively, and are rejected for the same reasons.

Claim 28 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 27**, as covered by Yeap in view of Shenoi, **further comprising: providing a coarse adjustment of said Hilbert bandpass filter with a determined carrier frequency**; Yeap discloses adjusting (i.e. coarse adjustment) the bandpass filters based on a spectral analysis (i.e. that generate a determined carrier frequency) (column 6, lines 31-36). Therefore, Yeap in view of Shenoi makes obvious all limitations of the claim.

Claim 29 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 28**, as covered by Yeap in view of Shenoi, **further comprising: determining said determined carrier frequency using an FFT analyzer**; Yeap discloses determining the noisiest common mode frequency (i.e. determined carrier frequency) using a FFT analyzer (column 9, line 60-column 10, line 8). Therefore, Yeap in view of Shenoi makes obvious all limitations of the claim.

Claim 34 is essentially the same as claim 7 and is rejected for the same reasons.

Claims 1, 10, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bingel in view of Yeap.

Claim 1 is limited to a **DSL front end, comprising: an AM interference canceller that outputs a signal representative of AM interference**; Bingel discloses a DSP that generates an AM interference cancellation signal (column 4, lines 13-16). Bingel discloses a differential receiver. Therefore, Bingel discloses all limitations of the claim with the exception of a **hybrid that provides a bi-directional interface with a communication channel**; Yeap teaches to use a hybrid for bi-directional interface with a twisted pair (i.e. communication channel) It would have been obvious to one of ordinary skill in the art to implement a hybrid as taught by Yeap for the purpose of providing a differential receiver as disclosed by Bingel. **Said hybrid generating an output signal representative of a signal received from said communication channel**; Bingel discloses receiving a signal from the communication line (i.e. generating an output signal representative of a signal received from channel) through the differential receiver (i.e. hybrid) (column 3, lines 28-42). **A summer that combines said output of said AM interference canceller with a signal based upon the output of the hybrid such that the AM interference in said DSL front end is substantially cancelled**; Bingel discloses an adder (figure 2, element 13) that combines a differential received signal and an interference cancellation signal (column 3, lines 49-53).

Claim 10 is essentially the same as claim 1, as covered by Bingel in view of Yeap, and is rejected for the same reasons.

Claim 20 is essentially the same as claim 1, as covered by Bingel in view of Yeap, and is rejected for the same reasons.

Claims 6, 15, 19, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bingel in view of Yeap as applied to claim 1 above, and further in view of Srinivasagopalan et al. (US Patent 4,689,804).

Claim 6 is limited to **the DSL front end according to claim 1**, as covered by Bingel in view of Yeap. Therefore, Bingel in view of Yeap discloses all limitations of the claim with the exception **wherein: said signal representative of AM interference is generated from a carrier signal recovery phase locked loop**; Srinivasagopalan teaches locking onto a sinusoidal noise source (i.e. AM carrier interference signal) using a phase locked loop so that the frequency and phase information can be used to eliminate the phase jitter from the received transmission (abstract and column 1, lines 28-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a phase locked loop as taught by Srinivasagopalan for the purpose of detecting the frequency of the common mode interference signal as and use that data for eliminating the interference as disclosed by Bingel in view of Yeap.

Claim 15 is essentially the same as claim 6 and is rejected for the same reasons.

Claim 19 is limited to **the digital subscriber line front end according to claim 10**, as covered by Bingel in view of Yeap. Therefore, Bingel in view of Yeap makes obvious all limitations of the claim with the exception **wherein said AM interference canceller comprises: a carrier recovery phase locked loop tuned to a most significant frequency of an interfering AM radio signal**; Srinivasagopalan teaches

using a phase locked loop to determine a frequency of a sinusoidal noise source (i.e. interfering AM radio signal) (abstract and column 1, lines 28-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a phase locked loop as taught by Srinivasagopalan for the purpose of detecting the frequency of the common mode interference signal as and use that data for eliminating the interference as disclosed by Bingel in view of Yeap. **A sine gain adjustment to generate a sine signal relating to said most significant frequency;**

Srinivasagopalan teaches sine wave generation (column 6, lines 63-65) and gain adjustment (column 2, lines 42-46 and 60-68). **A cosine gain adjustment to generate a cosine signal relating to said most significant frequency;** Srinivasagopalan teaches cosine wave generation (column 6, lines 63-65) and gain adjustment (column 2, lines 42-46 and 60-68) that is related to the frequency of the phase locked loop (i.e. relating to the most significant frequency). Therefore, Bingel in view of Yeap and in further view of Srinivasagopalan makes obvious all limitations of the claim.

Claim 30 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 20**, as covered by Bingel in view of Yeap. Therefore, Bingel in view of Yeap makes obvious all limitations of the claim with the exception **wherein: said AM interference replica signal is generated using an AM carrier recovery PLL**; Srinivasagopalan teaches generating an interference cancellation signal using a phase locked loop (abstract) It would have been obvious to one of ordinary skill in the art at the time of the invention to use a phase locked loop as taught by Srinivasagopalan for the purpose of detecting the frequency of the common

mode interference signal as and use that data for eliminating the interference as disclosed by Bingel in view of Yeap. **Followed by gain adjustments of cosine and sine phases of said recovered AM carrier signal;** Srinivasagopalan teaches adaptively updating gain of cosine and sine waves (column 2, lines 42-46 and 60-68). Therefore, Bingel in view of Yeap and in further view of Srinivasagopalan makes obvious all limitations of the claim.

Claim 31 is limited to **the method of canceling an AM interference signal from a digital subscriber line signal according to claim 30**, as covered by Bingel in view of Yeap and in further view of Srinivasagopalan, **further comprising: adjusting said gain adjustments based on an LMS algorithm** The examiner takes Official Notice of the fact that the LMS algorithm is used to perform adaptive updating of a noise cancellation system. It would have been obvious to one of ordinary skill in the art at the time of invention to implement an LMS module for the purpose of adaptively updating the gain of the cosine and sine waves of Bingel in view of Yeap and in further view of Srinivasagopalan.

Response to Arguments

Applicant's arguments with respect to claims 1-34, filed 8 March 2004, have been fully considered but they are not persuasive.

With respect to claims 1, 10, 20, and 32, the applicant alleges that the amendment of these claims distinguishes them over the cited prior art (amendment, pages 9-10); the examiner respectfully disagrees. In particular, claim 1 is limited to a

summer that combines an AM interference cancellation signal with the output of a hybrid (amendment, claim 1, lines 9-11). It is clear that Yeap discloses such a structure in figure 5. In particular, the outputs of processing block 18 and hybrid 13 are combined at summing junction 19. Claim 1 further includes the limitation of an AM interference canceller that outputs a signal representative of AM interference to said hybrid. Yeap discloses a noise estimator that detects all noises, including AM interference, that are presented to the hybrid (column 6, lines 16-24).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e. **presenting a noise cancellation signal to a hybrid that sums a cancellation signal**) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The rejections of claims 10, 20, and 32 are similarly maintained for at least the reasons given above because they are essentially the same as claim 1.

With respect to claims 2, 11, and 24, the applicant alleges that the combination of Yeap in view of Bingel somehow does not teach the claimed invention (amendment, pages 10-11); the examiner respectfully disagrees. It is to be noted that Bingel is relied upon in claims 2, 11, and 24 only for the purpose of making it obvious to use a digital adder in place of the analog adder used by Yeap. Because Yeap has been shown to disclose the limitations of claims 1, 10, and 20, which 2, 11, and 24 are dependent from, the rejections of claims 2, 11, and 24 are maintained.

With respect to claims 6, 15, 19, 30, and 31, the applicant alleges that the combination of Yeap in view of Bingel and further in view of Srinivasagopalan does not teach the claimed invention (amendment, pages 12-13); the examiner respectfully disagrees. It is to be noted that Srinivasagopalan is relied upon for the purpose of making it obvious to use a phase locked loop for detecting and reducing sinusoidal phase jitter in a high speed data modem. In general, the teachings of Srinivasagopalan can be applied to any sinusoidal carrier-based transmission system, like that of DSL. Because the receiver of Yeap is a DSL receiver it will benefit from these teachings, and thus Srinivasagopalan is not non-analogous art. In addition, when the teachings of Srinivasagopalan and Yeap are combined, AM interference does become an issue because Yeap discloses a DSL receiver (column 5, lines 43-52).

The rejections of claims 1, 10, 20, and 32 have been updated in the previous sections to include the rationale presented here, the rejections do not include any new grounds.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

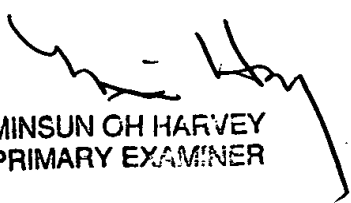
shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F Briney III whose telephone number is 703-305-0347. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

WFB
5/27/04


MINSUN OH HARVEY
PRIMARY EXAMINER